

***Orthocanthoides aristae*, a remarkable new genus and species of  
Tephritidae (Diptera) from Mount Kenya**

by

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ABSTRACT

A peculiar tephritid, *Orthocanthoides aristae*, new genus and species, is described from Mt. Kenya and its affinities within the *Sphenella* group of genera are discussed. The *Sphenella* group is redefined, and a key to the included genera provided.

INTRODUCTION

Among fruit flies that I recently collected on the slopes of Mt. Kenya were a male and female that could not be placed in any known genus. The flies were collected at an altitude of approximately 3 000 m by sweeping the forest undergrowth along the Naro Moro track, close to the upper forest line, just above the meteorological station. Among other plants of the undergrowth were a few species of Asteraceae, one of which is suspected to be the host of this species. No clear association between the flies and any of these plants was established, however.

The flies, which show some peculiar characters, are described herein as a new genus and species within the subfamily Tephritinae. However, the taxon also shows characters found in the Trypetinae. A similar situation occurs in some other taxa, such as the genus *Axiothauma* Munro, 1946. *Axiothauma* includes three species, all restricted to high elevations (3 000–4 300 m) in Kenya. The apparent endemism of Tephritidae on high mountains in East Africa was also reported by Munro (1951), who described three species of *Paroxyna* from the Shira Plateau (elevation 4 100 m) on Kilimanjaro. Additional species of *Paroxyna*, apparently endemic to East African high altitudes, were described by Munro (1957a).

My own collecting experience in East Africa indicates that there is a notable diminution in both tephritid abundance and diversity above 3 000 m. In addition, the higher one climbs, the more difficult collecting becomes both because of excessive moisture and deficiency of oxygen. Nevertheless, collecting in high altitudes is often rewarding because of the frequent discovery of endemics and, as in the present case, of morphologically peculiar species.

Within the Tephritinae, the new taxon is related both to *Axiothauma* and to the *Sphenella* group of genera which Munro (1957b) revised and keyed. A redefinition of, and an enlarged generic key to, the *Sphenella* group of genera is therefore presented, followed by the description of the new taxon and a discussion of its affinities.

AFFINITIES OF THE *SPHENELLA* GROUP OF GENERA

Munro (1957b:16) defined the *Sphenella* group of genera, discussed its relationships with other Tephritinae and gave a key to the six included genera. The discovery of the new taxon described here makes it necessary to re-evaluate Munro's characterisation and, as a result, to include it in this group together with a few additional genera. A key to the ten genera now recognised in the *Sphenella* group is given below, as well as a short discussion of the taxonomic status of some of the genera.

Munro's diagnosis of the group was rather broad. Conversely, he suggested only one reliable character, the width of the lower calypter, to distinguish it from the *Paroxyna* group. The inclusion of four additional genera, as proposed here, apparently further complicates this situation. Nevertheless, it is done because these genera seem to be more closely related to the six previously included genera than to any other taxa.

The *Sphenella* group of genera is characterised by the following combination of characters: Frontal vitta hairy; usually 2 frontal bristles, but some species occasionally with supernumerary bristles, and others with a smaller, anterior, 3rd bristle, that is either whitish or dark; proboscis usually spatulate or short geniculate, less often capitate; 4, equal or subequal, scutellar bristles, apical pair rarely distinctly shorter than basal pair, even then they are at least half as long as the basal pair; wing pattern generally reticulate-banded, more banded in some genera, more reticulate in others; lower calypter usually as wide as upper, sometimes distinctly narrower; terga usually spotted; sternum 6 in male very narrow, strap-like, epandrium of the normal ovoid tephritine shape, but often with conspicuous generic traits; distiphallus moderately to heavily sclerotised, vesica absent or short; aculeus usually rather wide at apex, often with preapical 'shoulders'. Where known, the species are associated with species of *Senecio* and related genera (Asteraceae).

The distinction between the *Sphenella* group, as understood here, and the *Paroxyna* group (Munro 1957a) is difficult, as the two merge into each other and may need to be united. To make this distinction, Munro (1957b) used a single character, namely the wide lower calypter, which was applicable to the six genera treated by him (in the *Paroxyna* group the lower calypter is narrow). However, this character is no longer applicable to the group in its broader sense (as proposed here), because in *Mastigolina* and Genus A (see below), it is variable among the species, and in *Axiiothauma* and *Orthocanthoides* the lower calypter is narrow. Other characters also cannot be used unequivocally for the separation of the two groups. Thus, most taxa in the *Paroxyna* group have the apical scutellar bristles less than half as long as the basals, and the frontal vitta bare. However, *Scedella* species have subequal scutellar bristles, and *Mesoclanis* species have hairy frontal vitta, as is the case in the *Sphenella* group. Both genera agree with *Paroxyna* in all other respects. Most taxa in the *Paroxyna* group have pre-aedeagal setulae on the distiphallus, while none of the species in the *Sphenella* group has such setulae. However, species of *Antoxya* and *Dioxya*, which are considered as closely related to *Paroxyna*, do not have these setulae.

Both groups of genera show chaetotaxic characters that are unusual in the

Tephritinae. In both groups there is a trend toward the development of scapular bristles, which, in extreme cases, reach the degree of development encountered in Trypetinae. Another trend observed in the major cephalic and thoracic bristles is their darkening and acuminate shape. Again, in extreme cases, such as in *Axiiothauma* and the new species described here, all cephalic and thoracic bristles are dark and acuminate, a situation most characteristic of the Trypetinae. These two trends and others, such as the darkening of the abdominal setulae and the small amount of microtomentum on the abdomen, can lead to the incorrect placement of genera in subfamilies.

#### KEY TO GENERA OF THE *SPHENELLA* GROUP OF GENERA

(Comments on some genera are given below)

- 1 Hind femur anteroventrally with a row of bristles which are about as long as the width of the femur ..... 2
- Hind femur anteroventrally without a row of long bristles, at most apically with a row of much shorter bristles. .... 5
- 2 Vein  $R_{4+5}$  setose to crossvein r-m or beyond ..... **Paratephritis** Shiraki
- Vein  $R_{4+5}$  bare or with 1–3 setulae at node ..... 3
- 3 Scutellum flat, yellowish, epandrium with only single prensiseta on each of the inner surstyli, and without posterior prong or spur ..... **Sphenella** Robineau-Desvoidy
- Scutellum slightly to strongly convex, brownish to black; epandrium with 2 prensisetae on each of the inner surstyli, and with posterior prongs or spurs 4
- 4 Scutellum strongly convex, shiny black; fronto-facial angle about  $130^\circ$  ..... **Oedasphe**nella Frey
- Scutellum slightly convex, brownish; fronto-facial angle about  $105^\circ$  ..... **Bevismyia** Munro
- 5 Large, heavy-bodied species, usually over 5 mm in length; head angular in profile; fronto-facial angle about  $90^\circ$ ; wing hyaline or brownish, lacking pattern or with very restricted, sexually dimorphic pattern ..... **Axiiothauma** Munro
- Slender-shaped species, usually well under 5 mm in length; head usually oval; fronto-facial angle distinctly larger than  $90^\circ$ ; wing with or without distinct pattern. .... 6
- 6 Thoracic bristles short and straight or nearly straight, nail-like; ♂ with pattern restricted to apex of wing; ♀ with greyish hyaline wing, lacking pattern; arista of ♂ with a turbinate plate at apex ..... **Orthocanthoides** gen. n.
- Thoracic bristles long and curved as normal, wing pattern well developed, sexually dimorphic or not; arista normal ..... 7
- 7 Gena anteroventrally with a row of lanceolate, conspicuous setulae; frons shorter than wide; dorsocentral bristles aligned only slightly behind suture .... **Mastigolina** Munro
- Gena anteroventrally with small, fine setulae; frons longer than wide; alignment of dorsocentral bristles variable ..... 8

- 8 All cephalic and thoracic bristles acuminate and dark (including posterior frontal, postoculars and posterior notopleural bristles); wing usually banded, pattern usually M-shaped, rarely grading into reticulate-banded, usually sexually dimorphic and paler in ♂; proboscis short, capitate . . . . . Undescribed Genus A
- At least some of the cephalic or thoracic bristles lanceolate, pale; wing reticulate, although pattern sometimes reduced, not sexually dimorphic; proboscis variable. . . . . 9
- 9 Wing pattern a pale reticulation, with dark spots along the costa from pterostigma to apex, and usually also on crossveins; 2 frontal bristles; epandrium posteriorly with a pair of long, downwardly directed spurs . . . . . **Telaletes** Munro
- Wing pattern dark, reticulate-banded, with a complete band over crossveins, sometimes merged with a complete broad costal band; 2–3 frontal bristles; epandrium without such spurs . . . . . **Orotava** Frey

### **Orthocanthoides** gen. n.

Type species: *Orthocanthoides aristae* sp. n., by present designation.

Diagnosis: 2 frontal, 2 orbital bristles, these and postoculars black, frons slightly pubescent, arista micropubescent, broadened at apex in ♂; proboscis short, but apparently spatulate. Thoracic bristles black, short, straight or almost so; scapulars absent, but some prominent hairs present; 1 postpronotal, 1 presutural, 2 notopleurals, the posterior one very short,  $\frac{1}{4}$  to  $\frac{1}{3}$  as long as anterior one, 1 dorsocentral, aligned between suture and anterior supra-alar, 1 prescutellar, 2 (pairs) subequal scutellars; 1 anepisternal, 1 anepimeral, 1 katepisternal; hind femur anteroventrally without bristles; vein  $R_{4+5}$  bare; r-m crossvein situated approximately opposite middle of cell dm; wing of ♀ without pattern; wing of ♂ modified postero-apically, with somewhat distorted venation, an external flap in cell M and restricted pattern. Thorax and abdomen almost entirely black, with dense grey microtomentum; no spots visible on abdomen; abdominal pubescence dark; epandrium rounded; aculeus rather wide.

*Orthocanthoides* is closely related to *Axiiothauma* Munro and could be confused with this genus because of the similarity in general morphology and in the structure of the male and female terminalia. It is possible that with the discovery of additional, related species, the two genera may need to be united. The main characters separating the genera are as follows: *Axiiothauma* species are generally large, heavy-bodied and usually more than 5 mm in length. The head is distinctly angular, with the fronto-facial angle 90° or less and distinctly protrudent; the eye is low, resulting in a relatively high gena, which is much higher than the height of the antenna; the frons occupies about half of the width of the head; the antenna is usually much shorter than the face (as little as half of it); the arista is normal, not broadened in any way; thoracic bristles usually curved as usual, but in *A. nigrinitens* they very much approach the situation found in *Orthocanthoides*; posterior notopleural bristle well developed, at least half as long as anterior bristle, often about as long; 2 anepisternal bristles, although the lower one may be shorter than

the upper one; in the wing r-m crossvein is usually placed in the apical  $\frac{1}{3}$  of cell dm, although in *A. edwardsi* it is closer to the middle of the cell.

The single known species of *Orthocanthoides* is smaller and slender-bodied; the head is less angular, with the fronto-facial angle about  $110^\circ$  and hardly protrudent; the eye is higher, resulting in a gena about as high as antennal height; the frons occupies only about 0,43 of the head width, the antenna is 0,8 of the height of the face, and the arista in the male broadens peculiarly at the tip; thoracic bristles straight, nail-like; posterior notopleural bristle less than  $\frac{1}{3}$  the length of the anterior bristle; only one anepisternal bristle present; r-m crossvein is placed only slightly beyond the middle of cell dm.

Etymology: The generic name is derived from the Greek *orthos*—straight and *akantha*—a thorn, referring to the straight bristles. The gender is feminine.

### ***Orthocanthoides aristae* sp. n.**

Figs 1–6

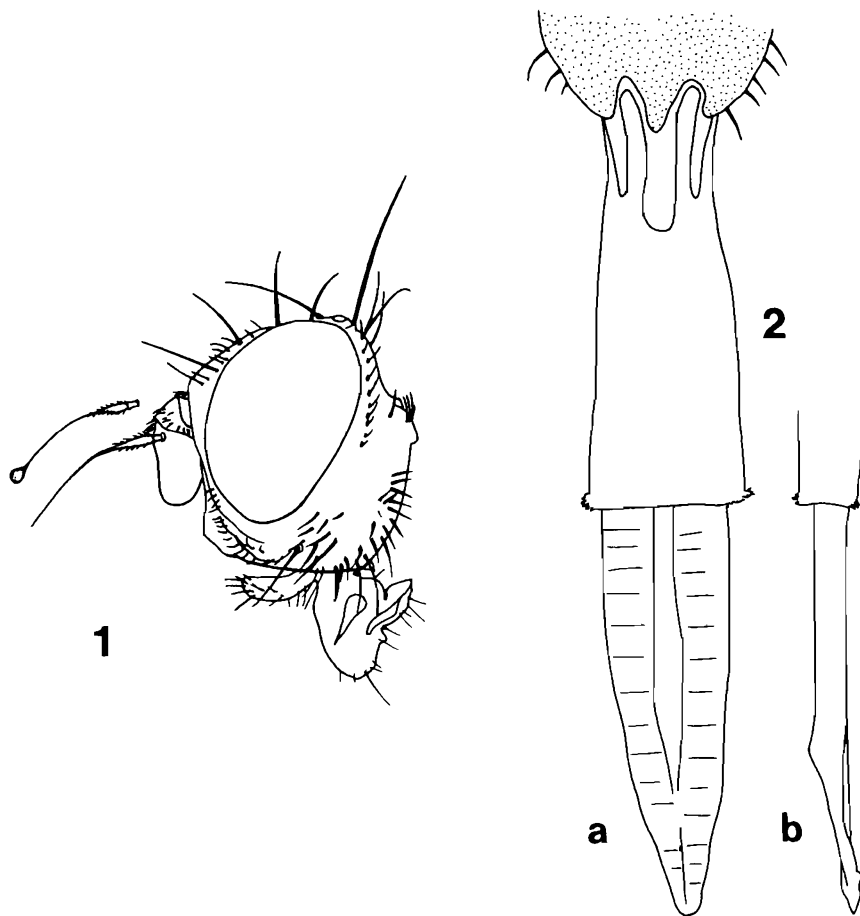
#### *Female*

**Head** (Fig. 1): Length to height to width ratio—8:9:10; frons at vertex 0,43 width of head; length of frons 1,2 times greater than width at vertex, 1,5 times width at level of lunule; in lateral view parafacial about as wide as base of arista; gena slightly narrower than height of antenna; antenna 0,8 height of face; 1st flagellomere about twice as long as high, rounded at apex; proboscis short, but labella slightly extended backwards; palpus shaped as in Fig. 1; frons in lateral view convex; fronto-facial angle about  $110^\circ$ , not very angular; face flat; lower facial margin somewhat protruding; basal segment of arista about  $1\frac{1}{2}$  times as long as wide; next segment swollen at base, otherwise thin; basal  $\frac{1}{3}$  of arista with very short hairs, the rest bare. **Colour:** Frons honey yellow, not microtomentose, with the anterior half darker; ocellar triangle and frontal plates blackish, with greyish microtomentum; orbits whitish yellow; lunule, face, parafacial, gena and lower  $\frac{2}{3}$  of occiput whitish; upper part of occiput blackish; scape yellow; pedicel mainly yellow, with a large, black spot dorsally; 1st flagellomere black, except the extreme base yellow; arista mostly blackish, brownish yellow just beyond the swollen part; proboscis yellow; palpus whitish, the apex margined with black. Bristles and setulae black; hairs on frons, parafacial and lower occiput whitish to yellowish.

**Thorax:** Ground colour predominantly black; postpronotum and anepisternum partly yellow; all parts covered by dense grey microtomentum, nevertheless when viewed in certain angles appear subshiny; two broad dorsocentral stripes of brown microtomentum are present. Bristles stout, black, straight or almost straight, dorsocentral bristles aligned slightly closer to anterior supra-alars than to suture; hairs whitish. Calypteres narrow, whitish, upper one with brown margin; halter yellow.

**Legs:** Predominantly yellow, with some darkening of fore femur externally, especially on distal half.

**Wing** (Fig. 5): Costal spine small, barely distinct among costal setulae; pterostigma about 3 times as long as wide; the ratio of the four sections of vein M (beginning



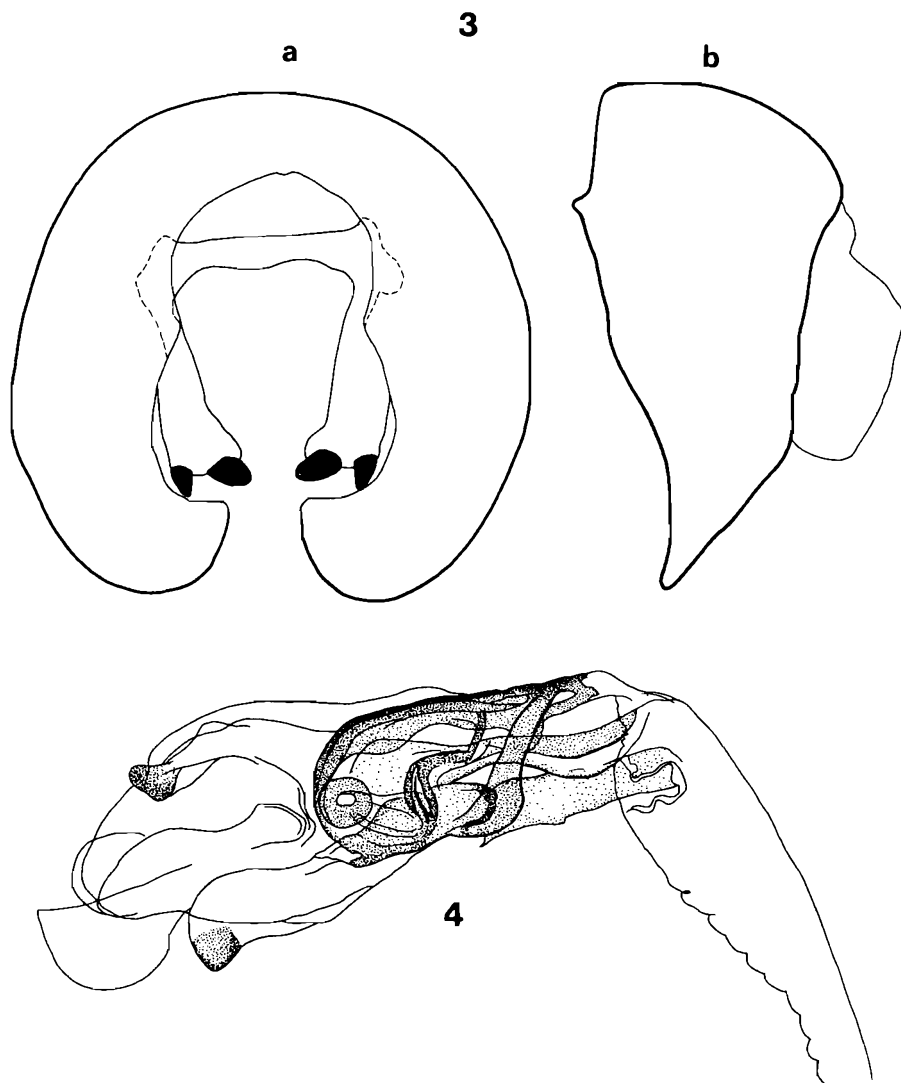
Figs 1-2. *Orthocanthoides aristae* sp. n. 1. Head, lateral view (a) female holotype (b) arista of male allotype. 2. Ovipositor (drawn from the pinned specimen) (a) dorsal view (b) lateral view.

with the proximal one) is 1:1,2:1,1:1,2; point of cell cup small; longitudinal veins generally straight; wing brownish grey, with yellow pterostigma and dark microtrichia all over, without pattern.

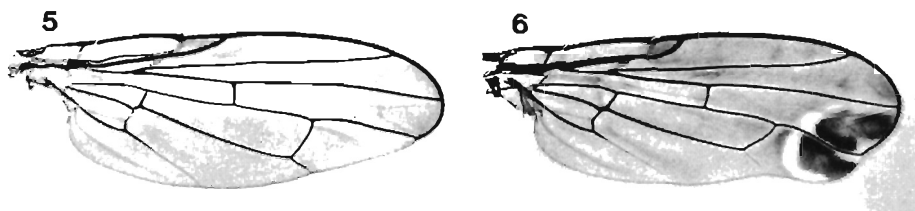
**Abdomen:** Ground colour black, entirely covered by dense grey microtomentum but dorsum more strongly shiny than thorax and with a slightly bronze sheen; bristles (laterally on most terga and posterolaterally on tergum 6) and hairs fine, blackish. Tergum 6 about 1,5 times as long as tergum 5. Oviscape in dorsal view about as long as combined length of posteriormost 3-4 terga, shiny; basal  $\frac{2}{3}$  and apical  $\frac{1}{2}$  black, also black is a narrow median stripe connecting these dark parts, the rest yellow; hairs brownish, fine and rather sparse; aculeus (Fig. 2) rather wide and broadly pointed at apex.

**Male:** Agrees generally with the description of the female, but with the following differences: Antenna entirely yellow, although pedicel appears to have a dark spot because of a concentration of dark setulae; arista (Fig. 1b) as in ♀, but apex

broadened into a turbinate plate with a silvery reflection; palpus entirely whitish yellow. Wing (Fig. 6); pterostigma about twice as long as wide; vein M ratio—1:1,2:1:1,2; last section of vein M sinusoidal and strongly diverging from vein  $R_{4+5}$ ; dm-cu crossvein more oblique in position, with its posterior end tilted basally; last section of vein  $CuA_1$  faint, wing margin at cell M bulging out, forming a narrow flap; wing generally with a more greyish tone; apex of cells  $r_{4+5}$  and m together with a characteristic pattern, including a blackish spot in both cells; these spots together surrounded basally and posteriorly by an incomplete white ring. Abdominal tergum 5 about as long as combined length of terga 3 and 4. Epandrium (Fig. 3) rounded; outer surstyli in posterior view wide, in lateral view pointed;



Figs 3–4. *Orthocanthoides aristae* sp. n. 3. Epandrium (a) posterior view (b) lateral view. 4. Distiphallus.



Figs 5-6. *Orthocanthoides aristae* sp. n., wing. 5. Female. 6. Male.

2 pairs of prensisetæ present, and spurs are lacking; distiphallus (Fig. 4) strongly sclerotised; vesica almost as long as sclerotised part, structurally complicated, with 2 flaps that are moderately sclerotised apically.

Material examined: KENYA: 1 ♀ (holotype) 1 ♂ (allotype) Mt. Kenya, Met. Station, 3 000-3 300 m, 21.viii.(19)83, A. Freidberg. The holotype and allotype are double-mounted on minuten pins in polyporous cubes, are in excellent condition and are deposited in the entomological collection, Department of Zoology, Tel Aviv University.

Etymology: The specific name is derived from the peculiarly shaped arista of the male.

Remarks: This species is closely related to species of *Axiothauma* (especially *A. nigrinitens*) differing from them in the characters used to distinguish the two genera.

#### COMMENTS ON SOME GENERA INCLUDED IN THE KEY

##### *Axiothauma* Munro

The terminalia of *Axiothauma* species have not been described. Through the courtesy of Dr I. M. White [British Museum (Nat. Hist.)] I was able to examine a pair of each of the three known species, including the female holotype of *A. albinodosum* and three other paratypes. A male paratype of *A. edwardsi* and a female, determined by me in 1979 as this species, both from Mt. Elgon (at the Kenya-Uganda border), were dissected. Their terminalia show great resemblance to those of *Orthocanthoides*. The epandrium is also rounded, and the distiphallus strongly sclerotised, although more elongate. The aculeus is more pointed and with subapical shoulders. Two flask-like spermathecae were present. An egg, 2 mm long, was found.

##### *Mastigolina* Munro

This genus was placed by Munro (1947) in the Aciurinae. Munro (1957a) described *Ptosanthus* and placed it in the Tephritinae. A preliminary study indicates that the two genera are the same, and that this taxon belongs to the *Sphenella* group of genera. A revision of the genus is in preparation.

##### Genus *A*

This is an unnamed genus that was recorded by Cogan & Munro (1980:527) as 'Undescribed genus of Trypetinae'. A formal description of this genus and its included species (ca.17) is in preparation. (Freidberg & Hancock, in prep.).



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